

April
1965

THE FUTURE OF THE ATLAS LABORATORY

Look 2 years
4 years
6 years ahead.

2 Years:

Universities will get machines of their own which will have an immediate effect - KDF 9 and ICT 1900 Series.

Rutherford Laboratory likely to be with us during the whole period.

Harwell is a big question mark.

During this time we must get a much clearer picture of what can be expected for the different customers. I do not think we should promise more help to other customers such as Government Departments without a definite allowance being made available. The SRC must reach decisions on the Harwell, Rutherford Laboratories and press that they get machines of their own as soon as possible. The old links have now been broken and we should advise SRC of the present difficult role the Atlas has to play - the present user structure is nearly impossible to satisfy. SRC could press Harwell and Rutherford to think hard and money should be provided for their own machines. I do not think that with Harwell and Rutherford load released we should have difficulty in filling Atlas time with Internal, University and External work - turn round time would improve greatly.

4 Years:

The next period to consider is when most Universities have something approaching reasonable facilities, then the position of the Atlas Lab. in relation to the Universities is difficult to imagine. Are we to remain in possession of a large machine to act as off load for local computers and to provide unusual facilities linking various University computers? How do we fit in with the work of the groups within the Grants and Mathematics Division of SRC? Can we have a separate existence as a quasi - University Lab. and what should our main interests be?

If we are to have a computer to serve the needs of Universities for off-loading, then it is inevitable that we must have a large machine. Unless this machine is a very large American machine reasonably well developed and tried then we will be involved with the development of a British machine and we should then aim to establish a group within the Lab. intimately concerned with the Lab's requirements for such a machine. At the moment I do not feel we are completely set up to deal with this problem.

We are not aware of what software the Computer firms will supply in the future and we should get our position straight here. Will firm's software always remain slightly unsatisfactory? Will there be a case for continued software activity in the Lab.?

The continued activity in the field of unusual requirements, processors to take say 803 Algol and other compilers, will lead to a continuance of the variety and nonstandard hardware and software.

The attempt to provide, with computers in scientific research, the dual activity of computing services and computer research does not lead to a very sensible situation. Universities take up the use of different compilers for a variety of reasons and what most University users want is to do work. Scientific users have now switched their attention from treating the hardware as a toy to playing with software. The present position is certainly unsatisfactory. I feel that we shall not overcome the dominant position of the US and it would seem sensible to follow IBM and if necessary take their compilers and examine, speed up, rewrite sections and then sell back the ideas to other users. The continued attempt to avoid the consequences of American power can only lead to inefficiency, a collection of disjointed efforts is no way to go about competing with a giant. We must ask what is to be gained by writing new compilers and improving old ones. Can we make a big enough impression software wise to stake our future on this?

The work of the other groups with us in SRC seems a better thing to concentrate on - involvement with their problems and the looking for new ideas brought up by the supply of grants would do a lot to keep us with the real problems. Our main effort should go on writing real programs to deal with new problems in unlikely fields of application - the one point we have in our favour is the continuity we could bring to large problems - research workers for Ph.D are limited in time and effort they can give to a piece of work. It is possible that a lot of things are done in a mediocre way, but few are really carried out well. I note the frantic rush to complete Ph D work on computers - Statistics, Dr. Tocher slow development of computeise statistics? Find the really useful pieces of research in Universities and help to extend the work where and when it is required.

I think that we must have an active mathematical interest - the attempt to go into information retrieval and other data processing activities is more appropriate to other divisions of SRC and I am not convinced that it would be so useful when it is done. We have number theorists who need a fast large machine - an interest in partial differential equations (DBR etc) also needing these facilities - theorem proving - there is a great interest in problems of clustering - electronics statistics, taxonomy, etc. survey work is highly rated.

It seems to me that the computing facilities will become cheaper and cheaper and that we should not worry too much about the inefficiencies of compilers, but be in a position to use what facilities we have to solve problems, that we find, Fortran subroutines that do not work, Algol procedures that contain mistakes indicates that the continued investigation of how to achieve arithmetic excellence is being forgotten. Letting hundreds of people loose on the machines probably wastes more time than all the search for extra efficiency by software people. I am inclined to agree with Fox about the state of the arithmetic. People who do not know the first thing about computing are frequently noticed by us since we have to deal with them. Survey analysis workers do not have the right approach to their work we ought to be investigating how programs are written how to go about this what can be don to help in making a large program readable to an outsiders. What makes general programs undesirable in certain spheres.

Considering the position of the Atlas Lab. six years ahead, I feel that we must either become a settled numerical mathematics laboratory with a tried reliable machine providing services, or attempting the more difficult task of always having machines in advance of the general demand with all the attendant difficulties experienced by pioneers.

A computer of the size required could only be obtained from the States and it should become evident in the near future what machines would be suitable and reliable. It is clear that the emphasis may well move away from computers providing a service to control of processes and there may be a slowing down in the development of faster and bigger machines. Our strength ought to depend on the use of machines in scientific work and we must be in a position to do this with real problems.

If we are to try out new machines and ideas then we must be able to buy machines and alter our course more frequently. This will cost money - but could provide British manufacturers with an incentive - prepared plans could be vetted and instructions for a machine to be built could be made if the ideas seem sound. We should have to be organised quite differently. I am not sure that this is what a Government sponsored Lab. should do, but will manufacturers carry out their field testing of machines satisfactorily? I do not think we should try to provide for both functions - research and machine development, and I am more inclined to the view that a clearer future lies ahead with mathematical and logical work than with hardware/software development.

22.4.65

JEH